

FEB 27 2007

Attorney Docket No.: 6459,500-US
February 27, 2007US Application No.: 11/685,368
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1. (currently amended) A peptide comprising the amino acid sequence of formula I:

His-X²-X³-Gly-X⁵-Phe-X⁷-X⁸-X⁹-X¹⁰-X¹¹-X¹²-X¹³-X¹⁴-X¹⁵-X¹⁶-X¹⁷-X¹⁸-Ala-Arg-X²¹-Phe-Ile-X²⁴-Trp-Leu-Ile-X²⁸-Thr-Arg-Ile-Thr-X³³ (formula I)

wherein X² is Ala, Val, or Gly; X³ is Asp or Glu; X⁵ is Ser or Lys; X⁷ is Ser or Lys; X⁸ is Asp, Glu, or Lys; X⁹ is Asp, Glu, or Lys; X¹⁰ is Met, Lys, Leu, Ile, or Nor-Leucine; X¹¹ is Asn or Lys; X¹² is Thr or Lys; X¹³ is Ile or Lys; X¹⁴ is Leu or Lys; X¹⁵ is Asp or Lys; X¹⁶ is Asn or Lys; X¹⁷ is Leu or Lys; X¹⁸ is Ala or Lys; X²¹ is Asp or Lys; X²⁴ is Asn or Lys; X²⁸ is Gln or Lys; X³³ is Asp, Glu, or Lys and at least one of X⁵, X⁷, X⁸, X⁹, X¹⁰, X¹¹, X¹², X¹³, X¹⁴, X¹⁵, X¹⁶, X¹⁷, X¹⁸, X²¹, X²⁴, X²⁸, and X³³ is a Lys.

2. (original) The peptide of claim 1, wherein the peptide consists essentially of an amino acid sequence:

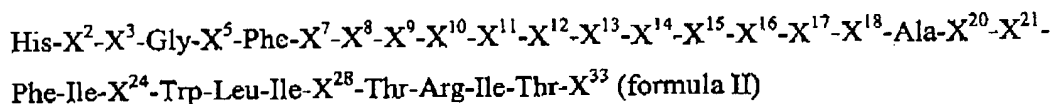
His-X²-X³-Gly-X⁵-Phe-X⁷-X⁸-X⁹-X¹⁰-X¹¹-X¹²-X¹³-X¹⁴-X¹⁵-X¹⁶-X¹⁷-X¹⁸-Ala-X²⁰-X²¹-Phe-Ile-X²⁴-Trp-Leu-Ile-X²⁸-Thr-Arg-Ile-Thr-X³³ (formula II)

wherein X² is Ala, Val, or Gly; X³ is Asp or Glu; X⁵ is Ser or Lys; X⁷ is Ser or Lys; X⁸ is Asp, Glu, or Lys; X⁹ is Asp, Glu, or Lys; X¹⁰ is Met, Lys, Leu, Ile, or Nor-Leucine; X¹¹ is Asn or Lys; X¹² is Thr or Lys; X¹³ is Ile or Lys; X¹⁴ is Leu or Lys; X¹⁵ is Asp or Lys; X¹⁶ is Asn or Lys; X¹⁷ is Leu or Lys; X¹⁸ is Ala or Lys; X²⁰ is Arg or Lys; X²¹ is Asp or Lys; X²⁴ is Asn or Lys; X²⁸ is Gln or Lys; X³³ is Asp, Glu, or Lys.

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3. (original) The peptide of claim 1, wherein the peptide consists of an amino acid sequence:



wherein X² is Ala, Val, or Gly; X³ is Asp or Glu; X⁵ is Ser or Lys; X⁷ is Ser or Lys; X⁸ is Asp, Glu, or Lys; X⁹ is Asp, Glu, or Lys; X¹⁰ is Met, Lys, Leu, Ile, or Nor-Leucine; X¹¹ is Asn or Lys; X¹² is Thr or Lys; X¹³ is Ile or Lys; X¹⁴ is Leu or Lys; X¹⁵ is Asp or Lys; X¹⁶ is Asn or Lys; X¹⁷ is Leu or Lys; X¹⁸ is Ala or Lys; X²⁰ is Arg, or Lys; X²¹ is Asp, or Lys; X²⁴ is Asn, or Lys; X²⁸ is Gln, or Lys; X³³ is Asp, Glu, or Lys.

4. (currently amended) The peptide of claim 1, wherein the amino acid sequence of formula I is characterized by at least one of the following X² is Ala or Gly; X⁵ is Ser; X⁷ is Ser; X⁸ is Asp or Glu; X⁹ is Asp or Glu; X¹⁰ is selected from the group consisting of Met, Leu, Ile, and Nor-Leucine; X¹¹ is Asn; X¹² is Thr; X¹³ is Ile; X¹⁴ is Leu; X¹⁵ is Asp; X¹⁶ is Asn; X¹⁷ is Leu; X¹⁸ is Ala; X²¹ is Asp; X²⁴ is Asn; X²⁸ is Gln; X³³ is Asp or ~~and~~ X³³ is Glu.

5. (currently amended) The peptide of claim 2, wherein the amino acid sequence of formula II is characterized by at least one of the following X² is Ala or Gly; X⁵ is Ser; X⁷ is Ser; X⁸ is Asp or Glu; X⁹ is Asp or Glu; X¹⁰ is selected from the group consisting of Met, Leu, Ile, and Nor-Leucine; X¹¹ is Asn; X¹² is Thr; X¹³ is Ile; X¹⁴ is Leu; X¹⁵ is Asp; X¹⁶ is Asn; X¹⁷ is Leu; X¹⁸ is Ala; X²¹ is Asp; X²⁴ is Asn; X²⁸ is Gln; X³³ is Asp; or ~~X³³ is~~ Glu.

6. (currently amended) The peptide of claim 3, wherein the amino acid sequence of formula II is characterized by at least one of the following X² is Ala or Gly; X⁵ is Ser; X⁷ is Ser; X⁸ is Asp or Glu; X⁹ is Asp or Glu; X¹⁰ is selected from the group consisting of Met, Leu, Ile, and Nor-Leucine; X¹¹ is Asn; X¹² is Thr; X¹³ is Ile; X¹⁴ is Leu; X¹⁵ is Asp; X¹⁶ is Asn; X¹⁷ is Leu; X¹⁸ is Ala; X²¹ is Asp; X²⁴ is Asn; X²⁸ is Gln; X³³ is Asp or ~~and~~ X³³ is Glu.

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7. (original) The peptide of claim 4, wherein X² is Ala.
 8. (withdrawn) The peptide of claim 4, wherein X² is Gly.
 9. (original) The peptide of claim 4, wherein X³ is Asp.
 10. (withdrawn) The peptide of claim 4, wherein X³ is Glu.
 11. (original) The peptide of claim 4, wherein X⁵ is Ser.
 12. (original) The peptide of claim 4, wherein X⁷ is Ser.
 13. (original) The peptide of claim 4, wherein X⁸ is Asp.
 14. (withdrawn) The peptide of claim 4, wherein X⁸ is Glu.
 15. (withdrawn) The peptide of claim 4, wherein X⁹ is Asp.
 16. (original) The peptide of claim 4, wherein X⁹ is Glu.
 17. (original) The peptide of claim 4, wherein X¹⁰ is selected from the group consisting of Met, Leu, Ile, and Nor-Leucine.
 18. (original) The peptide of claim 4, wherein X¹¹ is Asn.
 19. (original) The peptide of claim 4, wherein X¹² is Thr.
 20. (original) The peptide of claim 4, wherein X¹³ is Ile.
 21. (original) The peptide of claim 4, wherein X¹⁴ is Leu.

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22. (original) The peptide of claim 4, wherein X¹⁵ is Asp.
23. (original) The peptide of claim 4, wherein X¹⁶ is Asn.
24. (original) The peptide of claim 4, wherein X¹⁷ is Leu.
25. (original) The peptide of claim 4, wherein X¹⁸ is Ala.
26. (original) The peptide of claim 4, wherein X²¹ is Asp.
27. (original) The peptide of claim 4, wherein X²⁴ is Asn.
28. (original) The peptide of claim 4, wherein X²⁸ is Gln.
29. (original) The peptide of claim 4, wherein X³³ is Asp.
30. (withdrawn) The peptide of claim 4, wherein X³³ is Glu.
31. (original) The peptide of claim 1, wherein at least one amino acid independently selected from the list consisting of X⁵, X⁷, X⁸, X⁹, X¹⁰, X¹¹, X¹², X¹³, X¹⁴, X¹⁵, X¹⁶, X¹⁷, X¹⁸, X²⁰, X²¹, X²⁴, X²⁸, and X³³ is a Lys.
32. (original) The peptide of claim 2, wherein at least one amino acid independently selected from the list consisting of X⁵, X⁷, X⁸, X⁹, X¹⁰, X¹¹, X¹², X¹³, X¹⁴, X¹⁵, X¹⁶, X¹⁷, X¹⁸, X²⁰, X²¹, X²⁴, X²⁸, and X³³ is a Lys.
33. (original) The peptide of claim 3, wherein at least one amino acid independently selected from the list consisting of X⁵, X⁷, X⁸, X⁹, X¹⁰, X¹¹, X¹², X¹³, X¹⁴, X¹⁵, X¹⁶, X¹⁷, X¹⁸, X²⁰, X²¹, X²⁴, X²⁸, and X³³ is a Lys.

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34. (original) The peptide of claim 1, wherein up to 5 amino acid residues of formula I have been exchanged with an α -amino acid residue.

35. (original) The peptide of claim 1, wherein the peptide is selected from the group consisting of :

K30R-GLP-2(1-33);
S5K-GLP-2(1-33);
S7K-GLP-2(1-33);
D8K-GLP-2(1-33);
E9K-GLP-2(1-33);
M10K-GLP-2(1-33);
N11K-GLP-2(1-33);
T12K-GLP-2(1-33);
I13K-GLP-2(1-33);
L14K-GLP-2(1-33);
D15K-GLP-2(1-33);
N16K-GLP-2(1-33);
L17K-GLP-2(1-33);
A18K-GLP-2(1-33);
D21K-GLP-2(1-33);
N24K-GLP-2(1-33);
Q28K-GLP-2(1-33);
S5K/K30R-GLP-2(1-33);
S7K/K30R-GLP-2(1-33);
D8K/K30R-GLP-2(1-33);
E9K/K30R-GLP-2(1-33);
M10K/K30R-GLP-2(1-33);
N11K/K30R-GLP-2(1-33);

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T12K/K30R-GLP-2(1-33);
I13K/K30R-GLP-2(1-33);
L14K/K30R-GLP-2(1-33);
D15K/K30R-GLP-2(1-33);
N16K/K30R-GLP-2(1-33);
L17K/K30R-GLP-2(1-33);
A18K/K30R-GLP-2(1-33);
D21K/K30R-GLP-2(1-33);
N24K/K30R-GLP-2(1-33);
Q28K/K30R-GLP-2(1-33);
K30R/D33K-GLP-2(1-33);
D3E/K30R/D33E-GLP-2(1-33);
D3E/S5K/K30R/D33E-GLP-2(1-33);
D3E/S7K/K30R/D33E-GLP-2(1-33);
D3E/D8K/K30R/D33E-GLP-2(1-33);
D3E/E9K/K30R/D33E-GLP-2(1-33);
D3E/M10K/K30R/D33E-GLP-2(1-33);
D3E/N11K/K30R/D33E-GLP-2(1-33);
D3E/T12K/K30R/D33E-GLP-2(1-33);
D3E/I13K/K30R/D33E-GLP-2(1-33);
D3E/L14K/K30R/D33E-GLP-2(1-33);
D3E/D15K/K30R/D33E-GLP-2(1-33);
D3E/N16K/K30R/D33E-GLP-2(1-33);
D3E/L17K/K30R/D33E-GLP-2(1-33);
D3E/A18K/K30R/D33E-GLP-2(1-33);
D3E/D21K/K30R/D33E-GLP-2(1-33);
D3E/N24K/K30R/D33E-GLP-2(1-33); and
D3E/Q28K/K30R/D33E-GLP-2(1-33).

36. (withdrawn) A nucleic acid encoding the peptide of claim 1.

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37. (withdrawn) A nucleic acid encoding the peptide of claim 2.
38. (withdrawn) A nucleic acid encoding the peptide of claim 3.
39. (withdrawn) A host cell comprising the nucleic acid of claim 36.
40. (withdrawn) The host cell of claim 39, wherein the host cell is a yeast cell.

41. (withdrawn) A GLP-2 derivative comprising a GLP-2 parent peptide, wherein a lipophilic substituent is attached to one or more amino acid residues of the GLP-2 parent peptide at a position relative to the amino acid sequence of SEQ ID NO:1 independently selected from the group consisting of S5, S7, D8, E9, M10, N11, T12, I13, L14, D15, N16, L17, A18, D21, N24, and Q28, with the proviso that said lipophilic substituent is not attached at the N-terminal amino acid residue or the C-terminal amino acid residue of the GLP-2 parent peptide.

42. (withdrawn) The GLP-2 derivative of claim 41, wherein the GLP-2 parent peptide comprises an amino acid sequence:

His-X²-X³-Gly-X⁵-Phe-X⁷-X⁸-X⁹-X¹⁰-X¹¹-X¹²-X¹³-X¹⁴-X¹⁵-X¹⁶-X¹⁷-X¹⁸-Ala-X²⁰-X²¹-
Phe-Ile-X²⁴-Trp-Leu-Ile-X²⁸-Thr-X³⁰-Ile-Thr-X³³ (formula III)

wherein X² is Ala, Val, or Gly; X³ is Asp or Glu; X⁵ is Ser or Lys; X⁷ is Ser or Lys; X⁸ is Asp, Glu, or Lys; X⁹ is Asp, Glu, or Lys; X¹⁰ is Met, Lys, Leu, Ile, or Nor-Leucine; X¹¹ is Asn or Lys; X¹² is Thr or Lys; X¹³ is Ile or Lys; X¹⁴ is Leu or Lys; X¹⁵ is Asp or Lys; X¹⁶ is Asn or Lys; X¹⁷ is Leu or Lys; X¹⁸ is Ala or Lys; X²⁰ is Arg or Lys; X²¹ is Asp or Lys; X²⁴ is Asn or Lys; X²⁸ is Gln or Lys; X³⁰ is Arg or Lys; X³³ is Asp, Glu, or Lys.

43. (withdrawn) The GLP-2 derivative of claim 41, wherein the GLP-2 parent peptide consists essentially of an amino acid sequence:

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His-X²-X³-Gly-X⁵-Phe-X⁷-X⁸-X⁹-X¹⁰-X¹¹-X¹²-X¹³-X¹⁴-X¹⁵-X¹⁶-X¹⁷-X¹⁸-Ala-X²⁰-X²¹-
Phe-Ile-X²⁴-Trp-Leu-Ile-X²⁸-Thr-X³⁰-Ile-Thr-X³³ (formula III)

wherein X² is Ala, Val, or Gly; X³ is Asp or Glu; X⁵ is Ser or Lys; X⁷ is Ser or Lys; X⁸ is Asp, Glu, or Lys; X⁹ is Asp, Glu, or Lys; X¹⁰ is Met, Lys, Leu, Ile, or Nor-Leucine; X¹¹ is Asn or Lys; X¹² is Thr or Lys; X¹³ is Ile or Lys; X¹⁴ is Leu or Lys; X¹⁵ is Asp or Lys; X¹⁶ is Asn or Lys; X¹⁷ is Leu or Lys; X¹⁸ is Ala or Lys; X²⁰ is Arg or Lys; X²¹ is Asp or Lys; X²⁴ is Asn or Lys; X²⁸ is Gln or Lys; X³⁰ is Arg or Lys; X³³ is Asp, Glu, or Lys.

44. (withdrawn) The GLP-2 derivative of claim 41, wherein only one lipophilic substituent is attached to the GLP-2 parent peptide.

45. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent comprises about 4-40 carbon atoms.

46. (withdrawn) The GLP-2 derivative of claim 44, wherein the lipophilic substituent comprises about 8-25 carbon atoms.

47. (withdrawn) The GLP-2 derivative of claim 45, wherein the lipophilic substituent comprises about 12-20 carbon atoms.

48. (withdrawn) The GLP-2 derivative of claim 41, wherein a carboxyl group of a lipophilic substituent forms an amide bond with an amino group of an amino acid residue of the one or more amino acid residues.

49. (withdrawn) The GLP-2 derivative of claim 44, wherein the amino acid residue is a Lys residue.

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50. (withdrawn) The GLP-2 derivative of claim 41, wherein an amino group of a lipophilic substituent forms an amide bond with a carboxyl group of an amino acid residue of the one or more amino acid residues.

51. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is attached to the GLP-2 parent peptide by means of a spacer.

52. (withdrawn) The GLP-2 derivative of claim 51, wherein the spacer is an unbranched alkane α,ω -dicarboxylic acid group having from 1 to 7 methylene groups and forms a bridge between an amino group of an amino acid residue in the GLP-2 parent peptide and an amino group of the lipophilic substituent.

53. (withdrawn) The GLP-2 derivative of claim 51, wherein the spacer is an amino acid residue, other than a Cys residue, or a dipeptide.

54. (withdrawn) The GLP-2 derivative of claim 51, wherein the spacer is selected from the group consisting of β -alanine, gamma-aminobutyric acid (GABA), γ -glutamic acid, Lys, Asp, Glu, a dipeptide containing Asp, a dipeptide containing Glu, and a dipeptide containing Lys.

55. (withdrawn) The GLP-2 derivative of claim 53, wherein a carboxyl group of an amino acid residue in the parent GLP-2 peptide forms an amide bond with an amino group of said spacer, and the carboxyl group of the amino acid or dipeptide spacer forms an amide bond with an amino group of the lipophilic substituent.

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56. (withdrawn) The GLP-2 derivative of claim 53, wherein an amino group of an amino acid residue in the parent GLP-2 peptide forms an amide bond with a carboxylic group of the spacer, and an amino group of said spacer forms an amide bond with a carboxyl group of the lipophilic substituent.

57. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent comprises a partially or completely hydrogenated cyclopentanophenathrene skeleton.

58. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is an straight-chain or branched alkyl group.

59. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is the acyl group of a straight-chain or branched fatty acid.

60. (withdrawn) The GLP-2 derivative of claim 59, wherein the acyl group is selected from the group consisting of $\text{CH}_3(\text{CH}_2)_n\text{CO}-$, wherein n is 4 to 38, such as $\text{CH}_3(\text{CH}_2)_6\text{CO}-$, $\text{CH}_3(\text{CH}_2)_8\text{CO}-$, $\text{CH}_3(\text{CH}_2)_{10}\text{CO}-$, $\text{CH}_3(\text{CH}_2)_{12}\text{CO}-$, $\text{CH}_3(\text{CH}_2)_{14}\text{CO}-$, $\text{CH}_3(\text{CH}_2)_{16}\text{CO}-$, $\text{CH}_3(\text{CH}_2)_{18}\text{CO}-$, $\text{CH}_3(\text{CH}_2)_{20}\text{CO}-$, and $\text{CH}_3(\text{CH}_2)_{22}\text{CO}-$.

61. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is an acyl group of a straight-chain or branched alkane α,ω -dicarboxylic acid.

62. (withdrawn) A GLP-2 derivative according to claim 61, wherein the acyl group is $\text{HOOC}(\text{CH}_2)_m\text{CO}-$, wherein m is 4 to 38.

63. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is a group of the formula $\text{CH}_3(\text{CH}_2)_p((\text{CH}_2)_q\text{COOH})\text{CHNH-CO}(\text{CH}_2)_2\text{CO}-$, wherein p and q are integers and $p+q$ is an integer of 8-40.

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64. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is a group of the formula $\text{CH}_3(\text{CH}_2)_r\text{CO-NHCH}(\text{COOH})(\text{CH}_2)_2\text{CO-}$, wherein r is an integer of 10-24.
65. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is a group of the formula $\text{CH}_3(\text{CH}_2)_s\text{CO-NHCH}((\text{CH}_2)_2\text{COOH})\text{CO-}$, wherein s is an integer of 8-24.
66. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is a group of the formula $\text{COOH}(\text{CH}_2)_t\text{CO-}$ wherein t is an integer of 8-24.
67. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is a group of the formula $-\text{NHCH}(\text{COOH})(\text{CH}_2)_4\text{NH-CO}(\text{CH}_2)_u\text{CH}_3$, wherein u is an integer of 8-18.
68. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is a group of the formula $-\text{NHCH}(\text{COOH})(\text{CH}_2)_4\text{NH-COCH}((\text{CH}_2)_2\text{COOH})\text{NH-CO}(\text{CH}_2)_w\text{CH}_3$, wherein w is an integer of 10-16.
69. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is a group of the formula $-\text{NHCH}(\text{COOH})(\text{CH}_2)_4\text{NH-CO}(\text{CH}_2)_2\text{CH}(\text{COOH})\text{NH-CO}(\text{CH}_2)_x\text{CH}_3$, wherein x is an integer of 10-16.
70. (withdrawn) The GLP-2 derivative of claim 41, wherein the lipophilic substituent is a group of the formula $-\text{NHCH}(\text{COOH})(\text{CH}_2)_4\text{NH-CO}(\text{CH}_2)_2\text{CH}(\text{COOH})\text{NHCO}(\text{CH}_2)_y\text{CH}_3$, wherein y is zero or an integer of 1-22.
71. (withdrawn) The GLP-2 derivative of claim 41, wherein the GLP-2 derivative comprises at least two lipophilic substituents.

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72. (withdrawn) GLP-2 derivative according to claim 41, which is selected from the group consisting of:

S5K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
S7K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
D8K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
E9K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
M10K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
N11K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
T12K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
I13K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
L14K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
D15K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
N16K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(octanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(nonanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(decanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(undecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(dodecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(tridecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(tetradecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(pentadecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(heptadecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(octadecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(nonadecanoylamino)propionyl)-GLP-2(1-33);
L17K(3-(eicosanoylamino)propionyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(octanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(nonanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(decanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(undecanoylamino)butanoyl)-GLP-2(1-33);

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L17K((S)-4-carboxy-4-(dodecanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(tridecanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(tetradecanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(pentadecanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(hexadecanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(heptadecanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(octadecanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(nonadecanoylamino)butanoyl)-GLP-2(1-33);
L17K((S)-4-carboxy-4-(eicosanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(octanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(nonanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(decanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(undecanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(dodecanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(tridecanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(tetradecanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(pentadecanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(hexadecanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(heptadecanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(octadecanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(nonadecanoylamino)butanoyl)-GLP-2(1-33);
L17K(4-(eicosanoylamino)butanoyl)-GLP-2(1-33);
A18K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
D21K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
N24K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
Q28K(3-(hexadecanoylamino)propionyl)-GLP-2(1-33);
S5K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
S7K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
D8K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
E9K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);

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M10K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
N11K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
T12K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
I13K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
L14K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
D15K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
N16K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(octanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(nonanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(decanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(undecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(dodecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(tridecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(tetradecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(pentadecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(heptadecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(octadecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(nonadecanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K(3-(eicosanoylamino)propionyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(octanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(nonanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(decanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(undecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(dodecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(tridecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(tetradecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(pentadecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(hexadecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(heptadecanoylamino)butanoyl)/K30R-GLP-2(1-33);

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L17K((S)-4-carboxy-4-(octadecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(nonadecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K((S)-4-carboxy-4-(eicosanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(octanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(nonanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(decanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(undecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(dodecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(tridecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(tetradecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(pentadecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(hexadecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(heptadecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(octadecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(nonadecanoylamino)butanoyl)/K30R-GLP-2(1-33);
L17K(4-(eicosanoylamino)butanoyl)/K30R-GLP-2(1-33);
A18K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
D21K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
N24K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
Q28K(3-(hexadecanoylamino)propionyl)/K30R-GLP-2(1-33);
D3E/S5K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/S7K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/D8K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/E9K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/M10K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/N11K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/T12K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/I13K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L14K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/D15K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);

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D3E/N16K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(octanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(nonanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(decanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(undecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(dodecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(tridecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(tetradecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(pentadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(heptadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(octadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(nonadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(3-(eicosanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(octanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(nonanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(decanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(undecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(dodecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(tridecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(tetradecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(pentadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(hexadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(heptadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(octadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(nonadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K((S)-4-carboxy-4-(eicosanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(octanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(nonanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(decanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);

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D3E/L17K(4-(undecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(dodecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(tridecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(tetradecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(pentadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(hexadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(heptadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(octadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(nonadecanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/L17K(4-(eicosanoylamino)butanoyl)/K30R/D33E-GLP-2(1-33);
D3E/A18K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/D21K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33);
D3E/N24K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33); and
D3E/Q28K(3-(hexadecanoylamino)propionyl)/K30R/D33E-GLP-2(1-33).

73. (withdrawn) A pharmaceutical composition comprising the GLP-2 derivative of claim 41.

74. (withdrawn) A method for ameliorating a condition related to intestinal failure or malabsorption of nutrients in the intestine in a patient in need thereof, the method comprising administering a therapeutically or prophylactically effective amount of the pharmaceutical composition of claim 77.

75. (withdrawn - - currently amended) A method for the treatment of small bowel syndrome, inflammatory bowel syndrome, ~~Crohn's~~ Crohn's disease, colitis ~~including collagen colitis, radiation colitis, ulcerative colitis chronic radiation enteritis,~~ non-tropical sprue (gluten intolerance), ~~and~~ tropical sprue, Coeliac disease (gluten sensitive enteropathy), damaged tissue after vascular obstruction or trauma, diarrhea e.g. ~~tourist diarrhea and post-infective diarrhea,~~ chronic bowel dysfunction, dehydration, bacteremia, sepsis, anorexia nervosa, damaged tissue after chemotherapy e.g. ~~chemotherapy-induced intestinal mucositis, premature infants in-~~

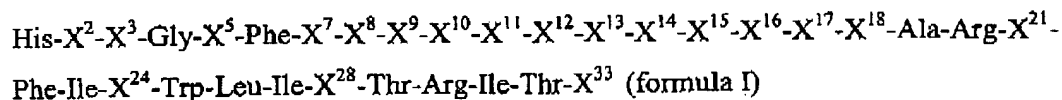
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intestinal failure in premature infants, ~~preborn infants incl~~-intestinal failure in preborn infants, scleroderma, gastritis including atrophic gastritis, ~~postantrectomy atrophic gastritis and helicobacter pylori gastritis~~, pancreatitis, general septic shock ulcers, enteritis, cul-de-sac, lymphatic obstruction, vascular disease, and graft-versus-host disease, healing after surgical procedures, post radiation atrophy, and chemotherapy, weight loss in Parkinson's Disease, intestinal adaptation after surgical procedure, parenteral nutrition-induced mucosal atrophy, ~~e.g. total parenteral nutrition (TPN)-induced mucosal atrophy~~, and bone-related disorders including osteoporosis, ~~hypercalcemia of malignancy, osteopenia due to bone metastases, periodontal disease, hyperparathyroidism, periarticular erosions in rheumatoid arthritis, Paget's disease, osteodystrophy, myositis ossificans, Bechterew's disease, malignant hypercalcemia, osteolytic lesions produced by bone metastasis, bone loss due to immobilization, bone loss due to sex steroid hormone deficiency, bone abnormalities due to steroid hormone treatment, bone abnormalities caused by cancer therapeutics, osteomalacia, Bechet's disease, osteomalacia, hyperostosis, osteopetrosis, metastatic bone disease, immobilization-induced osteopenia, or glucocorticoid-induced osteoporosis~~ in a patient in need thereof, ~~the method~~ comprising administering a therapeutically or prophylactically effective amount of the composition of claim ~~73~~ 77 to the patient.

76. (withdrawn) A method for producing a peptide having GLP-2 activity, the method comprising cultivating a host cell of claim 39 in an appropriate growth medium under conditions allowing expression and recovery of the peptide.

77. (withdrawn - - currently amended) A GLP-2 peptide comprising the amino acid sequence of formula I:



or a fragment thereof; wherein X² is Ala, Val, or Gly; X³ is Asp or Glu; X⁵ is Ser or Lys; X⁷ is Ser or Lys; X⁸ is Asp, Glu, or Lys; X⁹ is Asp, Glu, or Lys; X¹⁰ is Met, Lys, Leu, Ile, or Nor-

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Leucine; X¹¹ is Asn or Lys; X¹² is Thr or Lys; X¹³ is Ile or Lys; X¹⁴ is Leu or Lys; X¹⁵ is Asp or Lys; X¹⁶ is Asn or Lys; X¹⁷ is Leu or Lys; X¹⁸ is Ala or Lys; X²¹ is Asp or Lys; X²⁴ is Asn or Lys; X²⁸ is Gln or Lys; X³³ is Asp, Glu, or Lys and at least one of X⁵, X⁷, X⁸, X⁹, X¹⁰, X¹¹, X¹², X¹³, X¹⁴, X¹⁵, X¹⁶, X¹⁷, X¹⁸, X²¹, X²⁴, X²⁸, and X³³ is a Lys.